# **Instructor Guide**



# 300: Input Output Control Equipment Module 3: Escalator Input/Output Control Equipment

**JUME** TRANSIT ELEVATOR/ESCALATOR CONSORTIUM

Elevator-Escalator – Escalator Input/Output Control Equipment

Instructor's Guide

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#### **Icons Used In This Guide**

#### Agenda

				Topic #	Topic Title	Duration
	<b>REVIEW</b> slides		INDIVIDUAL ACTIVITY	1	Overview	45 Minutes
				2	Sensors	30 Minutes
2	ASK		WRITE	3	Switches	30 Minutes
	CLASSROOM ACTIVITY		Multimedia	4	Indicators	30 Minutes
				5	Field Trip	120 Minutes
	SMALL GROUP ACTIVITY		REFER participants to	6	Summary	45 Minutes
					Total Time:	300 Minutes
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Elevator-Escalator – Escalator Input/Output Control Equipment

#### Instructor's Guide

### <u>Overview</u>

**Purpose** The purpose of this module is to: Provide the participants with an overview of the types of input and output control devices that are present in transit escalator systems.

#### Objectives

At the end of this lesson, the transit elevator/escalator trainee will be able to:

- Identify and describe applications of input and output control devices for escalator systems
- Identify and describe the function of variable control devices in an escalator system
- Identify and describe the function of sensors in an escalator system
- Identify and describe the function of switches in an escalator system
- Identify and describe the function of indicators in an escalator system

Materials Mandatory Mak

Optional

ry Make sure you have the following

- **PowerPoint Presentation**
- Coursebook
- Quizzes
- Pencils
- You may also want the following for optional activities:
  - Chalk board with chalk, large paper with marker, etc.
- Internet connection
- Lab, simulator or out of service elevator

Elevator-Escalator – Escalator Input/Output Control Equipment				
Module Length: 300 min Time remaining: 300	min This section: 45 min (11 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
Instructor's Notes	In your own words: Welcome to the course on Escalator Input/Output Control Equipment. Advance Riders depend on us. "These four units would be considered to be operating in tandemtwo up and two down. Tandem operating units must be "electrically interlocked where traffic flow is such that bunching will occur if the escalator carrying passengers away from the intermediate landing stops." If the second up escalator stops the first one must stop as well. If the second down escalator stops the first one must stop as well. Paris, France Image provided by: Pete Cushman on Elevator Bob.com" And this is all done through input and output control equipment. Advance	<section-header></section-header>		

Elevator-Escalator – Escalator Input/Output Control Equipment				
min This section: 45 min (11 slides) Section start time:	Section End Time:			
SAY	Materials Needed			
In your own words: Lets take a look at some of the key words we will be defining as move through this module: • Auxiliary • Coil • Comparer Card	✓ PPT slide 4 Newt/butput Control Evaluator Auxiliary - Comparer Card - Contract Speed - Contract Speed - Directional Indicator - Encoder Splitter Box - Handrall Inlet Switch			
<ul> <li>Contract Speed</li> <li>CPU Board</li> <li>Directional Indicator</li> <li>Encoder Splitter Box</li> <li>Handrail Inlet Switch</li> <li>Advance</li> <li>Handrail Speed Sensor</li> <li>Junction Box</li> <li>Main PC Board</li> <li>Non-Variable Control Devices</li> <li>PLC</li> <li>Relay</li> <li>Variable Control Devices</li> <li>Advance</li> </ul>	JJJJJ-Transit Elevator/Escalator Consortium         +			
	<ul> <li>min This section: 45 min (11 sildes) Section start time</li> <li>SAP</li> <li>San</li> <li>Anyour own words:</li> <li>Lets take a look at some of the key words we will be defining as move through this module:</li> <li>Auxiliary</li> <li>Auxiliary</li> <li>Auxiliary</li> <li>Auxiliary</li> <li>Auxiliary</li> <li>Comparer Card</li> <li>Comparer Card</li> <li>Comparer Card</li> <li>Comparer Card</li> <li>Comparer Card</li> <li>Comparer Card</li> <li>Auxiliary</li> <li>Auxiliary</li></ul>			

Elevator-Escalator – Escalator Input/	Output Control Equipment	ANNUAL CONTRACTOR OF A CONTRACTOR OFTA CONTRAC
Instructor's Guide		
Module Length: 300 minTime remaining: 300	min This section: 45 min (11 slides) Section start time:	Section End Time:
DO	SAY	Materials Needed
REVIEW slide	In your own words: Control Devices can either be non-variable or variable. ASK: What do you remember about non- variable devices? Allow participants to share possible answers.	✓ PPT slide 7 werdfordret Gendenser: Exature Variable & Non-variable Devices Non-variable Control Devices Earothe Augusted Canothe adgusted Canothe a
Instructor's Notes	Advance for answers. Non-variable control devices are just like they sound - they are set by the manufacturer to activate at a certain threshold Advance and cannot be adjusted. A few examples of non-variable control devices are below: Proken Drive Chain Device	
	Directional Indicator Emergency Stop Button Missing Step Detector Step Level Device Advance	

Elevator-Escalator – Escalator Input/Output Control Equipment				
Module Length: 300 min Time remaining: 255	min This section: 30 min (18 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
REVIEW slide     REFER participants	In your own words: <i>REFER participants to the course book.</i> How the Handrail Speed Sensor Works within the Transit Escalator Power feeds into the system from L1, L2 and L3. <i>Advance</i> L3 drops down and communicates with the Main CPU Board. <i>Advance</i> At the main controller board, power is sent to the handrail speed sensor through the J9 connector <i>Advance</i>	<section-header><section-header><text><image/><image/></text></section-header></section-header>		

Elevator-Escalator – Escalator Input/Output Control Equipment					
Module Length: min Time remaining: min	This section: min ( slides)	Section start time:	Section End Time:		
DO	SAY		Materials Needed		
REVIEW slides	In your own words: The handrail speed sensors use a roller with 12 steel pin 12 MM inductive proximity se Advance The sensor output time a pin passes the sensor Advance The controller tran number of pulses within a ce into handrail speed. Advance The splitter monitors the pro- and outputs the signals to the card through connector J9. Advance	(left and right) pick-ups and a ensor. ts a pulse each r head. nslates the ertain time period ximity sensors e PLC <b>comparer</b>	<section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header>		

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Module Length: 300 min Time remaining: 225	min This section: 30 min (12 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
REVIEW slides REFER participants	In your own words: <i>REFER participants to course book.</i> <i>Advance</i> Power feeds into the system from L1, L2 and L3. <i>Advance</i> L3 drops down and communicates with the Main CPU Board <i>Advance</i>	✓ PPT slides 33, 34 Intervention of the state		
Instructor's Notes	<b>REFER participants to course book.</b> <b>Advance</b> At the main controller board power is sent to the handrail inlet switch through the J1 connector.	Input (Vartput Control Explorment: Exclusion Handrail Inlet Switch Montgomery/KONE CPU Board J1, J6 and J7 Connectors		
	<b>Advance</b> Information is sent through the J6 and J7 connectors – J6 for lower inlet device sand J7 for upper safety devices <b>Advance</b>	✓ <u>Course book</u>		

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Instructor's Guide		
Module Length: 300 min Time remaining: 225	min This section: 30 min (12 slides) Section start time:	Section End Time:
DO	SAY	Materials Needed
REVIEW slide	<ul> <li>In your own words:</li> <li>Once power comes into the upper and then the lower junction boxes each switch is in series. Under normal operation, current will flow through the entire string and go back to the CPU signaling that everything is as it should be.</li> <li>If one of the safety devices along the string is activated the power will drop out from that point on deactivating the safety circuit relay – signaling to the CPU that there is a problem. At that point (1) the system stops operation, (2) drops the brake and (3) an error message will also be recorded in the service tool error log.</li> <li>Advance</li> </ul>	<section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header>
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Module Length: 300 min Time remaining: 225	min This section: 30 min (12 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
REVIEW slide	In your own words: The PLC will send signals to shut down power to the drive and to engage the brake. Note that while these signals are sent simultaneously, they take affect at varying time. The system will first shut down and then after a pre-determined length of time the brake will engage. <i>Advance</i> First, the corresponding relays in the run circuit will open, causing the escalator to stop. (D relay if the escalator was moving in a downward direction or U relay if the escalator was moving in an upward direction). This cuts off flow of energy to the motors. The escalator brake is a spring activated electrically lifted component. When adjusted properly it will stop and hold the escalator	<section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header>		
	Advance			

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Module Length: 300 min Time remaining: 225	min This section: 30 min (12 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
ASK Instructor's Notes	In your own words:         Three events that take place when voltage is detected at a safety device include:         1)	<section-header></section-header>		

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Module Length: 300 minTime remaining: 225	min This section: 30 min (12 slides) Section start time:	Section End Time:		
DO	SAY	Materials Needed		
<b>ASK</b> Instructor's Notes	In your own words: Name the parts in the diagram. <i>Call on participants for answer.</i> <i>Advance for the correct answer.</i> <i>Advance for the correct answer.</i> <i>Advance</i> 1. Handrail Inlet 2. Split Door Arrangement 3. Frontplate 4. Plunger 5. Switch <i>Advance</i>			

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Module Length: 300 min Time remaining: 195 r	min This section: 30 min (11 slides) Section start time:	Section End Time:
DO	SAY	Materials Needed
REVIEW slide   REFER participants	In your own words: <i>REFER participants to course book.</i> If the Direction Indicator Lights are Not On The System Will Not Operate This completes the circuit and energizes the coil SHT. 1rtn (ground) which causes the relay to pull in and make up either contact UX2 or DX2 – again, depending on the direction. This allows the current to flow to the direction lamps on the newel ends (Direction indicator lights). <i>Advance</i> The UX2 contact closes when the escalator moves in an upward direction, illuminating the upper red and lower green lights at the same time. <i>Advance</i>	<section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header>

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Module Length: 300 min Time remaining: 195	min This section: 30 min (11 slides) Section start time:	Section End Time:	
DO	SAY	Materials Needed	
ASK Instructor's Notes	In your own words: Lets see what we have learned so far: Yes or No. A directional indicator is especially helpful in heavy passenger traffic flow areas. <i>Call on participants for answer</i> <i>Advance for the correct answer</i> <i>Advance for the correct answer</i> <i>Answer:</i> Answer: Yes Why? The better orchestrated the movement of people, the smoother the traveling experience for all passengers. <i>Advance</i>	<section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header>	